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The genus Antrophyum — I. Synopsis of subgenera, and the American species

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The genus *Antrophyum*, as known at present, comprises more than thirty species of wide distribution in the tropics. Of this number, nine are confined to America, ranging from Mexico and Cuba on the north to Bolivia and southeastern Brazil on the south. The Old World species range from eastern Polynesia to Japan and China, south to New Guinea, the Mascarene Islands and Madagascar, and across Africa to the island of Fernando Po on the west coast.

The genus was established in 1824 by Kaulfuss,* who named six species, but recognized three more in a footnote. Three of the nine were American. The first species to be figured was the Old World *A. reticulatum* (Forster) Kaulfuss,† which may be considered as the type of the genus. Only one of the nine, the American *A. lanceolatum*, was known to Linnaeus.

The nine original species had been described under the Linnaean genus, *Hemionitis*, with which, however, they have very little affinity. They are probably more closely related to *Loxogramme* Presl. Blume recognized this when he classified several species properly belonging to the latter genus under *Antrophyum*,‡ and Presl placed one species of *Antrophyum* with *Loxogramme*.§

When the present work was commenced, it was intended to include the entire genus, but the material at hand was not suffi-

* Enum. Fil. 197. 1824.

† Schkuhr, Crypt. Gewächs. 6. *pl. 6.* 1805.

‡ Flora Jav. Fil. 84–87. *pl. 36, 37.* 1828.

§ Tent. 215. 1836.

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ciently complete for an exhaustive study of all the species, and in this paper only the American species are treated extensively. Complete descriptions of all the species can not be given without comparative study of the types in the European herbaria. Further field work is also necessary.

The herbarium of the New York Botanical Garden has furnished most of the material studied, but loans from the Eaton Herbarium and from the U. S. National Herbarium have been of great assistance, and hearty thanks are hereby tendered Professor Evans and Mr. Maxon for their aid. To Dr. Christ also, thanks are due for a loan of type material of one of his species.

ANTROPHYUM Kaulf. Enum. Fil. 197. 1824

Plants epiphytic or on rock (rarely in soil); rhizomes rather stout, short-creeping or suberect, usually clothed with a dense mass of fuzzy roots, together with the bases of old fronds; apical buds and stipe-bases covered with delicate deciduous clathrate scales whose cell-walls may be smooth or papillose; fronds cespitose, glabrous, membranous, coriaceous, or fleshy, sessile or with alate stipes; costas complete or vestigial, the secondary venation reticulate, without included veinlets, of long costal areolae and shorter, frequently divergent lateral ones, which may be closed along the margin, or open in free veinlets: sporangia in either simple or branching lines mostly along the longitudinal veins, free or more or less interconnected, or completely reticulated and on all the veins (in mature fronds), superficial or immersed in grooves; indusia wanting; paraphyses of various shapes may be mixed with the sporangia.

Various methods have been used to divide the genus into groups. Those based on gross foliar or soral differences alone have not been successful, as they have included in the same sections species which differed in fundamental characters such as spore-form. At the suggestion and aided by the advice of Dr. Underwood, to whom sincere thanks are due, the writer has endeavored to find out whether microscopic characters would furnish adequate means of separation. The results have been extremely satisfactory. Part of the scheme given below is based on that used by Fée in his monograph of the genus,* but it is very much modified and extended, and the characters are chosen so as to show

* Mém. Foug. 4: 39–52. 1852.

natural relationships. By a combination of the characters of soriation and spore-form, separation into four subgenera is readily made. The use of microscopic characters may be carried still further. The Asiatic species are easily divided into groups and to some extent, into species according to the shape of the soral paraphyses. By this means certain species, otherwise easily confused, may be separated without difficulty.

Four of the five African species, which possess several well-marked distinctive characters, have been separated as a new subgenus, **Antrophyopsis.*** The only other African species known, *A. immersum*, seems to belong rather with the type section.

The terms "diplanate" and "triplanate" have been used for the spores instead of the usual "reniform" and "sphaero-tetrahedral" as being of more exact significance, since they relate not to mere variable form but to systems of spore-cleavage.

Synopsis of subgenera

Soriation in mature fronds completely reticulated, superficial or slightly raised; spores diplanate; paraphyses present; costa vestigial, marginal veinlets free to the edge of the frond; stipe-scale cell-walls papillose (all?).

§ **Antrophyopsis** (African)*

Soriation of simple or branched lines which may be more or less interconnected but never completely reticulated, superficial or immersed in grooves; spores diplanate or triplanate, paraphyses present or absent; costa complete or vestigial, marginal veinlets usually anastomosing with the anterior veinlets to form closed areolae; stipe-scale cell-walls smooth.

Spores diplanate, paraphyses pyriform; costa complete.

§ SCOLIOSORUS (American)

Spores triplanate.

Sporangia in three or four long grooves on each side of the complete costa and parallel to it; paraphyses wanting. § POLYTAENIUM (American)

Sporangia, except in the three narrowest forms, in branched lines, more or less connected; paraphyses present or absent; costa complete or vestigial.

§ EUANTROPHYUM

Paraphyses wanting; costa complete or nearly so.

Costata (American)

Paraphyses present; costa vestigial. *Ecostata* (Old World)

The American section of the genus *Antrophyum* comprises nine species separable into three subgenera as noted in the group synopsis, according to (1) soriation, and (2) spore-form. All are alike in having a complete or nearly complete costa, a character distinguishing them from all the Old World forms, some of which,

* Type, *A. Boryanum* (Willd.) Spr.

however, approach this condition. A still more sharply distinctive character, if *A. ensiforme* be excluded, is the absence of paraphyses, which are found in all the Old World species.

On the basis of this character together with spore-form, *A. ensiforme* Hooker with diplanate spores may be separated from the others which lack paraphyses and have triplanate spores. Moore's genus *Scoliosorus* was based on this species, but on the strength of a non-existing character inferred from Hooker's incomplete description. The characters here given, however, and a slight but decided difference in soriation are sufficient to separate it at least as a subgenus.

Using soriation as a basis, Desvaux in 1827 established a new genus, *Polytaenium*, with *A. lineatum* as type. The sporangia in this species are in three or four long straight deep grooves on each side of the costa, and parallel to it, an arrangement considerably different from the normal American type which consists of series of divergent branching lines, superficial or only slightly immersed. In some of the broadest forms of *A. lineatum*, however, the type of soriation approaches the normal, and on the whole, the similarities seem greater than the differences, which are satisfied by recognition as a subgenus.

The remainder of the species belong to the costate section of *Euantrophyum*. After we eliminate *A. lanceolatum*, which is easily distinguishable, six species remain, two of which are described here for the first time, and one other which has never been accepted. These three are based on material originally identified as *A. subsessile* Kunze (*A. brasilianum* (Desv.) C. Chr.), but such reference is not justified. The six species form a group of coördinate forms, no one of which is entitled to stand as representative of the others. If *A. discoideum*, for example, be refused recognition, then logically *A. cayennense* which has always been recognized must also be referred to *A. brasilianum*. The fact that in the most superficial and easily determined character, outline, *A. discoideum* resembles *A. brasilianum* more closely, is not a sufficient reason for denying its validity. In reality it is less closely related to the latter fern than is *A. cayennense*, which shows its affinity in a coriaceous texture and closed marginal areolae, and sometimes even in outline.

Reasons of value equal to those just given for recognizing *A. discoideum* can be given for the admission of the other species treated here. Indeed, further field work may show that two or three other variant forms to which reference is made under the species concerned, are also entitled to specific rank.

The American species may be separated as follows:

Spores diplanate; paraphyses pyriform (*Scoliosorus*). 1. *A. ensiforme.*
Spores triplanate; paraphyses wanting.
Sporangia in long simple grooves parallel to costa (*Polytaenium*). 2. *A. lineatum.*
Sporangia not in long simple grooves (*Euantrophyum*).
Areolar axes longitudinal. 3. *A. lanceolatum.*
Areolar axes divergent.
Soral lines slightly sunken; marginal venation mostly closed in short areolae with few free veinlets.
Fronds coriaceous, margins reflexed.
Fronds oblanceolate, rather thick, opaque. 4. *A. brasilianum.*
Fronds elliptic, thin, translucent. 5. *A. cayennense.*
Fronds not coriaceous, margins flat; fronds oblong, long-acute. 6. *A. Dussianum.*
Soral lines superficial; marginal venation of open free veinlets.
Fronds broadly oblanceolate, short-stiped, thick. 7. *A. Jenmani.*
Fronds elliptic-lanceolate, sessile. 8. *A. anetioides.*
Fronds oblong or oblanceolate, subsessile, thin. 9. *A. discoideum.*

1. ANTROPHYUM ENSIFORME Hook.; Benth. Pl. Hartweg. 73. 1841. (Type from Mt. Totontepeque, Mexico.)

Antrophyum falcatum Mart. & Gal. Mém. Foug. Mex. 49. *pl. 12.* 1842.

Antrophyum carnosum Liebm. Vid. Selsk. Skr. V. 1: 161. 1849.

Antrophyum Galeottii Fée, Mém. Foug. 4: 51. *pl. 5. f. 4.* 1852.

Scoliosorus ensiformis Moore, Ind. Fil. xxix. 1857.

Dictyogramme ensiformis Trev. Atti Ist. Ven. V. 3: 592. 1877.

Spores diplanate, paraphyses pyriform, brown or yellow, on slender pedicels of various lengths which may arise singly or in clusters from a thickened basal cell; sporangia in simple or usually only once-forked, oblique, free, superficial lines along each side of the frond; fronds narrowly oblong, often curved, tapering very gradually below to a sessile base, less gradually above to a narrowly acute apex, thin, rather flaccid, 17 × 1.1–50 × 2.7 cm. margins reflexed, slightly repand; areolae in branching rows divergent

from the complete costa, open along the margin; costa and areolation superficially indistinct.

Mexico to Costa Rica.

Antrophyum ensiforme occupies a rather anomalous position in the genus. Moore in 1857 made it the basis of a new genus, *Scoliosorus*, giving the following reasons based on Hooker's description and figure. "This plant having neither netted veins nor netted sori, cannot possibly belong to *Antrophyum*." His misapprehension regarding the venation was due to the fact that in the original description no evidence of a secondary venation was shown.

But a distinct difference in soriation really exists. In *Euantrophyum*, the soriation consists of series of lines which usually branch several times, and may anastomose considerably. In immature fronds or in the narrowest specimens, the lines may be simple, but the relationship is obvious. In *Scoliosorus*, the soral lines are simple or usually only once-forked, and at a glance appear different from the normal type, although probably derived from it.

Another distinctive character is found in the paraphyses which are present in no other American species. These, however, do not differ essentially from one type found on some of the Old World species and may be indicative of a paraphysate ancestry for all the present species.

The character of greatest differential value known at present is found in the diplanate spores which entitle the species at least to rank as a subgenus. Judging from external characters, anatomical differences exist as well which would further distinguish it from the typical species.

2. ANTROPHYUM LINEATUM (Sw.) Kaulf. Enum. Fil. 199. 1824.
Hemionitis lineata Sw. Prodr. 129. 1788. (Type from Jamaica.)
Vittaria lanceolata Sw. Gesell. Naturf. Freund. Neue Schr. **2**: 133. *pl. 7. f. 2.* 1799.
Polytaenium laceolatum Desv. Prodr. 174. 1827.
Loxogramme lineata Presl, Tent. 215. 1836.
Polytaenium lineatum J. Sm. Jour. Bot. Hook. **4**: 68. 1841.

Spores triplanate; paraphyses wanting; sporangia in three or four long grooves on each side of and parallel to the costa, rarely interconnected: fronds linear-lanceolate, 43 × 1 cm. and 43 × 1.5 cm. (maximum), long-tapering, sessile, membranous; areolae long

and narrow, axes longitudinal, cross-veinlets transvese; venation indistinct.

West Indies and Mexico, south to Bolivia. Altitude: 500–1000 meters.

This is the most widely distributed of all the American species of *Antrophyum*. It is easily distinguished from *A. lanceolatum*, with which it is often associated, by its long straight soral grooves. In the broadest fronds, besides the longitudinal grooves, a series of short divergent ones may occur along each margin. One frond was seen which was intermediate between *A. lanceolatum* and *A. lineatum* in soriation and general appearance.

It is frequently referred to as a close relative of *Vittaria*, but it is really no more closely related than other species of *Antrophyum*. The only point of similarity is found in the deep soral grooves, which are, however, of little importance in determining the relationship as compared with the venation. In *Vittaria* this consists of a costa and two submarginal veins formed by the interlocking of pinnate branches from the axial vein. In *Antrophyum*, the venation consists of a primary costa, and a secondary system of reticulated veins of uniform size. In the narrow species of *Vittaria*, the pinnate veins are almost indistinguishable, and the venation apparently consists of three primary veins. *Antrophyum lineatum* seems to be in the process of developing a system of several longitudinal veins connected by secondary cross-veinlets, apparently in a manner similar to that in which the narrow species of *Vittaria* have evolved from the broader forms, but related to *Vittaria* only through some ancestral form of both. The process seems to take place by the gradual suppression of the transverse veins, first by a loss of fertility followed by a diminution in size. *A. lanceolatum* represents an earlier stage of the same process. In it the soral lines are mainly on the longitudinal veins, but not to such an extent as in the related species. If they were immersed the resemblance would appear much stronger.

3. ANTROPHYUM LANCEOLATUM (L.) Kaulf. Enum. Fil. 198. 1824. *Hemionitis lanceolata* L. Sp. Pl. 1077. 1753. (Type from Jamaica.) *Dictyogramme lanceolata* Trev. Atti Ist. Ven. V. **3**: 592. 1877. *Antrophyum Féei* Schaffner; Fée, Mém. Foug. **7**: 42. *pl. 22. f. 1.* 1857. (Type from Mexico.)

Spores triplanate; paraphyses wanting; sporangia in crooked superficial mostly longitudinal lines; fronds linear-lanceolate, 23 × 1–55 × 1.7 cm., usually broadest a little above the middle, sessile, membranous; costas percurrent; margins repand; areolae in rows parallel to the costa, usually pointed.

West Indies and Mexico to northern South America.

This species is one of the commonest and also most easily distinguishable of the genus. Only one other, *A. lineatum*, resembles it closely, and differences in soriation as well as less-marked differences in outline and in the texture of the living plant serve at once to distinguish the two.

In Mexico and Honduras true *A. lanceolatum* is replaced by the form *A. Féei*, which may prove distinct. It has fronds elliptic-lanceolate, 9 × 0.9–19 × 1.4 cm.; smaller and relatively much broader than the type form. Its best claim to recognition lies in the uniform way in which these characters are maintained, combined with its localization in Mexico and Honduras to the exclusion of the related form, which is, however, found not far away in Costa Rica. But if it is a good species, Dominica must be included in its range, since material in the herbarium of the N. Y. Botanical Garden from this island cannot be separated from that collected in Mexico.

4. ANTROPHYUM BRASILIANUM (Desv.) C. Chr. Ind. Fil. 59. 1905.
Hemionitis brasilianum Desv. Prod. 216. 1827. (Type from Brazil.)
Antrophyum subsessile Kunze, Anal. Pter. 29. *pl. 19. f. 1.* 1837. (Type from Peru.)
Antrophyum spathulatum Fée, Mém. Foug. **4**: 46. *pl. 4. f. 6.* 1852. (Type from Colombia.)

Spores triplanate; paraphyses wanting; sporangia in simple or branching lines, divergent from near the costa toward the margin: fronds oblanceolate or oblong, 19 × 1.7–30 × 3.5 cm., narrowed very gradually below, subsessile or with margined stipe of indeterminate length, short-acuminate, young fronds acute; epidermis glossy, wrinkled; margins thin and sharp, reflexed; areolae divergent from the costa, rather distinct on the back of frond; marginal areolae closed, small, costa percurrent, prominent below.

BOLIVIA: Isapuri, *Williams 1354;* Tumupasa, *Williams 1353;* San José, *Williams 1352.* BRAZIL: Ilheos, *Martius* (Herb.

Fl. Bras. *369.*) VENEZUELA: Tovar, *Fendler 305* (in part). COSTA RICA: Turrialba, *Maxon 180, 152; Wercklé.* GUATEMALA: Alta Verapaz, *Von Tuerckheim 8059.*

Owing to the uncertainty regarding Desvaux's type, the positive application of this name is at present impossible, but there seems to be little doubt but that it should replace *A. subsessile* Kunze. The two descriptions agree closely and Kunze himself admitted that they might refer to the same plant.*

A. spathulatum Fée is apparently nothing but an abnormally obtuse form which is not very unusual.

5. ANTROPHYUM CAYENNENSE (Desv.) Sprengel, Syst. **4**: 67. 1827.

Hemionitis cajennensis Desvaux, Berl. Mag. **5**: 311. 1811. (Type from French Guiana.)

Spores triplanate; paraphyses wanting; sporangia in branching, divergent, slightly sunken lines: frond elliptic, acute or acuminate, thin coriaceous, translucent; costa percurrent; margin reflexed; stipes 2–8 cm. long, blades 13 × 2.3–23 × 5 cm.; areolae divergent from the costa, marginal areolae closed, small.

BRITISH GUIANA: 1897, *Jenman.* TRINIDAD: Herb. Bot. Gard. Trin. *346, 1263; Fendler 151.*

The identity of *A. cayennense* is rather doubtful. Desvaux in 1811 described *Hemionitis cajennensis* from French Guiana, but his material was lost sight of and his description would fit either of two species now known from that locality. Kunze, however, arbitrarily applied this name to the form here described. The nomenclature can be definitely settled only by examination of Desvaux's original material.

The species which superficially resembles it most is *A. Jenmani*, from which, however, it differs largely in texture and marginal venation. The herbarium specimens examined had nearly all bleached out to a light color. Those of *A. Jenmani* are all dark-brown. *A. cayennense* has a further distinctive character in its stipe-scales which have much longer setae than any other of the American species.

6. **Antrophyum Dussianum** sp. nov.

Spores triplanate; paraphyses wanting; sporangia in simple or branching slightly sunken lines, divergent from near the costa to-

* Anal. Pter. 30.

ward the margin: fronds usually narrowly oblong, 20 × 2–40 × 3.4 cm., tapered gradually both ways, broader a little above the middle, long-acute (young fronds acute), subsessile, membranous, thin, dark-brown when dried; margin flat or slightly reflexed; areolation rather indistinct; areolae divergent from the costa; marginal venation of small closed areolae and some free veinlets; costa superficially distinct to the apex but not prominent.

Guadeloupe, *Père Duss 4226* (type). Also Martinique, *Duss 1549;* Dominica, *Lloyd 918;* Trinidad, *Fendler 151 B* (in Eaton herb.); Haïti, *Nash 1358;* Cuba, *Eggers 5269, Wright 775.*

Under this species is included all the West Indian *A. subsessile* so-called except that from Jamaica, which is placed with *A. discoideum.* It resembles *A. lanceolatum,* and seems to form a connection between this plant and the broader species of the genus. It is further distinguished from *A. brasilianum* by its less coriaceous texture and thinner frond, by the presence of rather numerous free veinlets along the margin, and by its less spatulate outline. From *A. discoideum* it is distinguishable by its sunken soral lines; its free veinlets are not punctate at the tips and do not occur regularly as in the latter form.

Two variant forms are included. That from Cuba, *Eggers 5269, Wright 775,* is narrower than the type material, 26 × 2.1–40 × 2.5 cm., and more coriaceous. That from Haïti, *Nash 1358,* is broader and more oblanceolate and acuminate, 25 × 3.5 cm. All three forms are alike in having the stipe-scales very long-attenuate, much more so than in any other American species.

7. **Antrophyum Jenmani** sp. nov.

Sporangia and spores not seen; soral lines apparently as in *A. brasilianum* and the other American species of *Euantrophyum:* fronds broadly elliptic to broadly oblanceolate, 19.5 × 4.5–28 × 7 cm., slightly acuminate, thick, flaccid, friable when dry, opaque; margins slightly reflexed; stipes thick, 2–5 cm. long; costa disappearing near the apex; areolation rather indistinct; areolae narrow, sometimes broad in young fronds, in branching rows which reach at the margin a wide angle of divergence from the costa; marginal areolae open.

BRITISH GUIANA: Potaro River, *Jenman* (type; det. *A. subsessile*); Demerara, Mt. Ragwa, *Jenman* (det. as above). GUIANA: *Leprieur 109* (U. S. Nat. Herb.).

Jenman refers to this plant as large *A. subsessile*,* but it is really one of the most distinct in the group, and it is hard to see how he could confuse it with the small thin form which occurs in Jamaica. It is the largest American species in the genus and is easily recognizable by its open marginal areolae, and its flaccid texture.

8. ANTROPHYUM ANETIOIDES Christ, Bull. Herb. Boiss. II. **5**: 12. 1905. (Type from Costa Rica.)

Spores triplanate; paraphyses wanting; sporangia in simple or branching, more or less connected, superficial lines divergent from the axis; fronds elliptic-lanceolate, 15 × 2.5–18 × 3.5 cm., acute (often blunted), rather thin, flaccid, friable when dry, opaque, sessile; margins very slightly reflexed; costa usually disappearing before the upper third, and scarcely visible even by transmitted light near the apex; areolation rather distinct; areolae divergent at a narrow angle from the axis; marginal areolae open.

COSTA RICA: Las Vueltas, *A. Tonduz 12757*.

Thanks to Dr. Christ's kindness in loaning me authentic material of this species, I have had opportunity to examine it at first hand and to compare it point by point with the related species. It differs from *A. brasilianum*, as he says, in texture and outline. In two other characters it is also easily distinguishable from this species, in its open marginal areolae, and indistinct costa. In its costal characters it is particularly interesting as suggesting a transition between the New and Old World species of this genus. In the species of the latter region, a costa is present usually only in the stipe or lower part of the frond. In the lamina, as a whole, or at least in the upper part, it becomes indistinguishable or can be traced only as a vein no larger than any other in the general network of the leaf. This is practically what happens in *A. anetioides*. The costa is nowhere prominent, and a little above the middle of the frond it can be distinguished only by transmitted light, while towards the apex it becomes no larger than the lateral veins.

9. ANTROPHYUM DISCOIDEUM Kunze, Bot. Zeit. **6**: 702. 1848. (Type from Colombia, *Karsten*.)

Spores triplanate; paraphyses wanting; sporangia in simple wavy or branching superficial lines, sometimes considerably con-

* Bull. Dept. Bot. Jam. II. **4**: 211. 1897.

nected, divergent from near the costa toward the margin; fronds elongate-oblong, 26 × 4 cm., 35 × 4 cm., 39 × 3.4 cm., narrowed very gradually below to a subsessile base, less gradually above to an acute apex (young fronds rounded or obtuse), membranous, firm; epidermis smooth and dull; margins flat, thin, slightly repand; areolation rather distinct; areolae divergent from the costa; marginal areolae open, ends of free veinlets enlarged and usually darkened; costa disappearing toward the apex, and visible only by transmitted light.

Colombia and Venezuela to Bolivia; Jamaica (?). Alt. 1800–2300 meters.

BOLIVIA: Santa Barbara, *Williams 1355*. VENEZUELA: Manoa, Lower Orinoco, *Rusby & Squires 371*; without definite locality, *Fendler 305*, in part (Eaton Herbarium).

Kunze's description is as follows: *A. fronde lineari-lanceolata, ensiformi-curvata, acuminata, bas longe attenuata in stipitem decurrente, tenuiter marginata, costata; venis obscuris, areolis erectis; soris immersis, flexuosis, interruptis, nec basin, nec apicem, nec marginem attingentibus.*

It will be seen that the two descriptions differ in two characters, outline and soriation. Kunze has "*lineari-lanceolata*" as compared with my "elongate-oblong," and "*soris immersis*" instead of "superficial." The difficulty regarding the first point is removed by a further reference to the form in his discussion of the species. He speaks of it as less spatulate than *A. brasilianum*. This would make it correspond to the description given here. In the other case, it is probable that the facts were misinterpreted. Soral lines which are not at all immersed, may appear so because of a blackening of the line of attachment. But, whatever the name eventually adopted for this species, it is distinct from *A. brasilianum*, with which it has always been confused.

The best distinctive character is found in the marginal venation, which in this species consists of free veinlets, the ends of which are thickened and usually blackened or brown. In good material these ends appear as a line of dots around the leaf about one and a half millimeters inside the thin margin. The dull smooth surface and the very thin tissue also serve to differentiate it from *A. brasilianum*, which has a wrinkled and rather glossy surface, and a thicker leaf.

The material of *A. subsessile* so-called from Jamaica seems to belong here, but its form is not typical. It is much shorter and usually more oblanceolate and less acute, but it shows to a marked degree the line of dots along the ends of the veinlets. The range in size is shown by the following specimens:

Underwood 1370. 21.5 × 2.5 cm.

Jenman, coll. in 1876. 18 × 3 cm.

Species inquirenda

ANTROPHYUM DESVAUXII Moore, Ind. Fil. 80. 1858.

Hemionitis gigantea Desv. Prodr. 216. 1827. (Type from St. Thomas, West Indies.)

Frondibus ecostatis, late lanceolatis, acutis, basi in stipitem late compressum dilatatis; lineolis dense reticulatis superficialibus. Habitat in insula Sancti-Thomae Antillarum. 2 ped. et ultra; 4 poll. lata. (Desvaux.)

The description agrees with that of Bory's *Antrophyum giganteum*, from the Mascarene Islands. The characters and dimensions given fit that species exactly. The following quotation from De Candolle's "Phytographie" may throw some light on the confusion. Speaking of Desvaux's herbarium, the writer says (page 408), "*Les omissions ou indications fausses de pays et la similitude de certains échantillons avec ceux du Muséum rendent cet herbier fort curieux.*" As the species under consideration could not possibly have come from the locality cited, the conclusions are obvious. The only possible explanation creditable to Desvaux, is that his material came from the African island, St. Thomas, which lies off the west coast, but this presupposes an improbable distribution for the fern, to say the least, and the accidental confusing of the two continents is not very likely.

Species excludenda

ANTROPHYUM MINIMUM Baker, Ann. Bot. **5**: 488. 1891. (Type from Costa Rica.) = **Hecistopteris minima** (Baker).

Soon after I began to study this species, I came to the conclusion that it belonged with *Vittaria* because of (1) the diplanate spores and the peculiarly shaped paraphyses, which are identical in form and size with those of *Vittaria costata* Kunze, (2) the

venation, which is that of a very young leaf of *Vittaria lineata* as figured in a paper on the life-history of that species by E. G. Britton and A. Taylor.* But further study showed me that it was certainly congeneric with *Hecistopteris pumila* (Spr.) J. Smith, which possesses similar paraphyses and spores, and, as shown by Goebel, † has a vittarioid prothallium. The only distinction, except in form, is found in the venation, free-forking in *H. pumila*, and pinnate-anastomosing in *H. minima*. Dr. Christ has described another species, *H. Werckleana* ‡ (*Antrophyum Werckleanum* §), which seems to be intermediate in form between the other two, and may show a transitional type of venation. In the material of *H. minima* examined (*Endres*), one frond was found showing a forked tip. The sori are not sunken as stated by Baker in his description, but entirely superficial and in other respects like those of *H. pumila*. Taken together, the three species form a very natural genus with affinities close to *Vittaria*.

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* Mem. Torrey Club **8**: 158–211. *pl. 23–31.* 1902.
† Flora **82**: 67. 1896.
‡ Bull. Bois. II. **7**: 265. 1907.
§ Bull. Bois. II. **5**: 11. 1905.

New western species of Gymnosporangium and Roestelia

FRANK DUNN KERN

Examination of a large number of specimens of *Gymnosporangium* and *Roestelia* from the Rocky Mountains has clearly shown that there exist in that region several species very unlike any now known in the eastern states or in foreign countries. Some of these western species are represented in the larger cryptogamic herbaria and are labeled with the names of other species, to which they have some slight resemblance, or are undetermined. For the most part they possess strong diagnostic characters and are easily distinguishable from the eastern species, but cultures, to supplement field observations, are necessary before the telial and aecial forms can be definitely connected. In order that the western species may be properly recognized, and for the sake of convenience in referring to the two stages independently before they are connected, the present paper characterizes six new species, three of *Gymnosporangium* and three of *Roestelia*. Studies of the western species in this group have been very materially advanced by the co-operation of Professor E. Bethel, of the East Denver High School, both through his many contributions of unusually fine specimens and through advice and assistance rendered to Professor J. C. Arthur and the writer, while on a collecting and observation trip in Colorado during the latter part of April and first part of May, this year.

Gymnosporangium Betheli sp. nov.

Telia appearing on irregular, elongated, gall-like knots varying from a few millimeters to several centimeters across, unevenly disposed, wedge-shaped, 1–1.5 mm. broad by 1–3 mm. long at the base by 3–4 mm. high, chestnut-brown, epidermal tissues raised and torn about the base; teliospores ellipsoid, 17–25 by 40–55 μ, rounded or somewhat narrowed above and below, slightly or not constricted at the septum, wall dark cinnamon-brown, varying in thickness on different spores, 1–2 μ, smooth, pedicel hyaline, cylindrical, uniform, 6–7 μ in diameter, very long, pores 2 in each cell, near the septum.

On branches of *Sabina scopulorum* (Sarg.) Rydb. (*Juniperus scopulorum* Sarg.), Boulder, Colorado, April 27, 1907, *Bethel & Kern* (type); Horsetooth Gulch, Fort Collins, Colorado, June 30, 1893, *C. F. Baker 124;* Walcott, Colorado, July, 1905, *E. Bethel,* May 2, 1907, *F. D. Kern;* Laramie Hills, Wyoming, September 13, 1899, *A. & E. Nelson 6907.* Type in the herbarium of J. C. Arthur.

This is without doubt the most injurious to the cedars of all the species. It produces gall-like knots on both small and large branches. The mycelium is perennial, but does not produce new hypertrophy within the scars of the old, but always extends to the unaffected tissues beyond or at the side. This gives the characteristic appearance of new galls beside the old galls. The tendency is for the succession of galls to break forth along the grain of the wood, thus forming an elongated area of hypertrophy. In the selection of a name the author takes the opportunity to show his appreciation of the courtesies shown by Professor Bethel in sending specimens and otherwise assisting in the study of this group, and especially of this species. Professor Bethel has made numerous collections of this species and has suggested a probable roestelia connection as a result of his excellent field observations.

Gymnosporangium durum sp. nov.

Telia appearing on firm, regular, globoid galls 0.5–5 cm. in diameter, unevenly disposed, sometimes aggregated, often separated by the scars of the sori of previous seasons, irregularly flattened, about 1–1.5 mm. broad by 1–5 mm. long at base by 3.5 mm. high, often confluent, light chestnut-brown, torn epidermal tissues not conspicuous; teliospores narrowly ellipsoid, 18–22 by 50–65 μ, narrowed at both ends, slightly constricted at the septum, wall pale cinnamon-brown, 1–1.5 μ thick, smooth, pedicel hyaline, cylindrical, uniform, 4–6 μ in diameter, very long, pores 2 in each cell, near the septum.

On branches of *Sabina utahensis* (Engelm.) Rydb. (*Juniperus californica utahensis* Engelm.), Glenwood Springs, Colorado, May 1, 1907, *F. D. Kern* (type), July, 1905, *E. Bethel;* Durango, Colorado, July 20, 1898 or '99, *Baker, Earle & Tracy,* May 24, 1907, *H. N. Wheeler,* communicated by E. Bethel; Mancos, Colorado, July 18, 1898, *Baker, Earle & Tracy.* Type in the herbarium of J. C. Arthur.

This species is characterized by the very regular, nearly globose, hard, woody gall which it produces. The mycelium is perennial for a few years or until the gall is usually several centimeters in diameter. The galls remain hanging on the trees for years. They are harder and more nearly globose than the galls produced by the eastern *G. globosum*.

Gymnosporangium inconspicuum sp. nov.

Telia usually arising between the scale-like leaves on the green branches, or rarely on the woody branches, scattered or usually aggregated and confluent, oblong, pulvinate, about 0.4–1 mm. wide by 0.5–1.5 mm. long by 0.5–1 mm. high, reddish-brown; teliospores oblong-ellipsoid, 25–29 by 55–80 μ, roundish or often acutish at apex, obtuse below, wall thin, about 1 μ, golden-yellow, smooth, pedicel hyaline, carotiform, swelling greatly next to the spore, 25–65 μ, very long, pores one in each cell, apical in the upper, near the pedicel in the lower cell.

On small branches of *Sabina utahensis* (Engelm.) Rydb. (*Juniperus californica utahensis* Engelm.), Glenwood Springs, Colorado, May 1, 1907, *Arthur & Kern*. Type in herbarium of J. C. Arthur; known only from the type locality.

As the name implies, this is a very inconspicuous species, and this fact undoubtedly accounts for its being overlooked up to the present time. The small, pulvinate sori breaking forth between the leaves soon become gelatinized and form a film over the surface of the leaves. In this condition it appears as if the spore-masses of some larger gall-form had dropped upon the leaves and clung there. In fact it was only after a great abundance had been seen that it was examined closely enough to be recognized as a genuine species. The teliospores are the largest of any of our known species. In general form they resemble *G. clavipes*, but are larger and the pedicel is swollen much more. Fruits of *Amelanchier* of the previous season, badly infested with a roestelia, were found still hanging to the trees in close proximity to the cedars abundantly bearing *G. inconspicuum* and it is strongly suspected that these forms may be different stages of the same species.

Roestelia Betheli sp. nov.

Pycnia fruiticolous and epiphyllous, numerous, gregarious, more or less crowded in irregular groups on discolored spots,

punctiform, subepidermal, honey-yellow becoming blackish, flask-shaped, 130–160 μ in diameter by 100–112 μ high; ostiolar filaments 45–65 μ long.

Aecia fruticolous and hypophyllous, densely aggregated or in small groups on discolored spots, cylindrical, 0.2–0.3 mm. in diameter, 3–8 mm. high; peridium dingy-white, becoming finely lacerate above, often nearly to base, spreading, cells linear-rhomboidal in longitudinal section, 16–20 by 60–90 μ, overlapping and imbricated, outer wall thin, 1–1.5 μ, inner wall moderately thick, 4–6 μ, coarsely rugose with closely set linear ridges directed outward and downward, hygroscopic; aeciospores globoid, 18–24 by 23–30 μ, wall chestnut-brown, 2.5–3 μ thick, finely verrucose, pores several, scattered.

On fruit and leaves of *Crataegus Cerronis* A. Nels., Boulder, Colorado, September 1905, *E. Bethel* (type), August 17, 1906, *E. Bartholomew*.

On leaves of *Crataegus saligna* Greene, Wolcott, Colorado, September, 1898, *C. L. Shear 947* (in Griffiths' West Am. Fungi, *no. 333*).

This is a very vigorous species developing an unusually long peridium. It is interesting on account of its supposed relation to *Gymnosporangium Betheli*, described above. The same specific name is applied to both forms with the hope that cultures will soon establish their identity.

Roestelia Harknessiana Ellis & Ev. sp. nov.

Pycnia unknown. Aecia fruiticolous, evenly disposed, cylindrical, 0.5–0.8 mm. in diameter, 4–7 mm. long; peridium golden-brown, tough, not becoming lacerate, cells rhomboidal in longitudinal section, 58–74 by 90–112 μ, somewhat overlapping, outer wall moderately thick, 4–6 μ, smooth, inner wall thick, 15–20 μ, rather coarsely and evenly verrucose with roundish or slightly irregular papillae; aeciospores globoid, 22–26 by 26–30 μ, wall light cinnamon-brown, 2–2.5 μ thick, finely verrucose, pores several, scattered.

On *Amelanchier alnifolia* Nutt., Klamath River, California, July, 1887, collector unknown, communicated by H. W. Harkness (in Ellis & Ev. N. Am. Fungi, *no. 2714*). Type in the Ellis collection at the New York Botanical Garden.

The collection here listed was issued by Ellis & Everhart in their North American Fungi (*no. 2714*), in May, 1892, without

any accompanying description. The name has since been used, but in an examination of the literature no publication with a description has been found. A Colorado collection was later issued under the same name (Ellis & Ev. Fungi Columb. *1293*, May, 1898), but it is very different both in gross and microscopical appearance and belongs with the new species proposed below. The geographical range of *R. Harknessiana* suggests a possibility of a connection with *G. Libocedri* (P. Henn.), which has the same limited distribution, but there is at present no other clue to introduce as evidence of their relationship.

Roestelia Harknessianoides sp. nov.

Pycnia fruiticolous, numerous, scattered or often more or less crowded over considerable areas, punctiform, subepidermal, honey-yellow becoming blackish, globoid, large, 160–220 μ in diameter by 150–210 μ high, ostiolar filaments 65–80 μ long.

Aecia fruticolous, scattered irregularly or crowded over the entire surface, cylindrical, 0.5–0.8 mm. in diameter, 2–4 mm. high; peridium yellowish-white, rather tough, not becoming lacerate, cells rhomboidal in longitudinal section, 45–55 by 65–100 μ, overlapping, outer wall moderately thick, 5–8 μ, smooth, inner wall very thick, 27–35 μ, moderately and closely verrucose with slightly irregular papillae; aeciospores globoid, 23–27 by 25–31 μ, wall pale-yellow, 2–2.5 μ, finely verrucose, pores obscure, scattered.

On fruit of *Amelanchier oreophila* A. Nels., Glenwood Springs, Colorado, July, 1905, *E. Bethel* (type in herbarium of J. C. Arthur).

On fruit of *Amelanchier alnifolia* Nutt. (?), Colorado, *E. Bethel* (in Ellis & Ev. Fungi 1293).

A very interesting species occurring only on the fruit. It has been confused with *R. Harknessiana* from which it differs in having shorter, lightly-colored peridia, peridial cells with a much thicker inner wall, and finer, closer markings, and spores with a lighter wall. It has a superficial resemblance and a similar habit of growth to the genuine *R. Harknessiana* and in separating it the name *Harknessianoides* has been chosen in order that it may carry with it this suggestion. This is the species mentioned above as having a possible connection with *Gymnosporangium inconspicuum*.

LAFAYETTE,
INDIANA.

Some Philippine Polyporaceae

William Alphonso Murrill

A large number of Philippine polypores have been added to the herbarium of the New York Botanical Garden during the last few years, mainly through the efforts of Mr. Robert S. Williams, who was collecting in the islands from November, 1903 to July, 1905, and to some extent from the collections of Mr. Elmer D. Merrill and Mr. A. D. E. Elmer, who sent material either to Mr. Ricker or myself for determination. A list of these additions to the herbarium is given in the following pages.

Mr. Williams collected the most of his specimens on the Lamao River and elsewhere on the slopes of Mt. Mariveles across the bay west of Manila. At Baguio, some distance to the north, he reached an elevation of 5200 feet, about 1000 feet higher than Mt. Mariveles, and found open pine woods, with much dead pine timber left by lumbermen. At Santa Cruz, on the Gulf of Davao, in Mindanao, he collected at an elevation of only a few hundred feet, and mostly in a more continuous forest than in the Lamao region. The specimens from Mr. Merrill and Mr. Elmer were collected in Luzon, Mindanao, Mindoro, Palawan, Culion, and Leyte.

A number of Philippine species which have been seen in European herbaria have as yet failed to appear in these additions, but it is hoped that the list will be complete enough in a year or two more so that a fairly full synopsis of Philippine polypores will be possible. Excursions into the interior of the larger islands will undoubtedly bring to light a considerable number of novelties, while further explorations among the smaller islands will serve more strongly to connect the native species with their relatives in Formosa, China, Japan, Malacca, Borneo, Java, Celebes, New Guinea, Australia, and the many small neighboring islands of the Pacific.

Subfamily POLYPOREAE

Coltricia cinnamomea (Jacq.) Murrill, Bull. Torrey Club **31**: 343. 1904.

Luzon: Mt. Mariveles, *Elmer 6949*.

COLTRICIA PERENNIS (L.) Murrill, Jour. Myc. **9**: 91. 1903.

Luzon: Baguio, *Williams.*

Coriolopsis aneba (Berk.) Murrill. *Polyporus anebus* Berk. Lond. Jour. Bot. **6**: 504. 1847. (Type from Ceylon.) *? Polyporus bicolor* Jungh. Fl. Crypt. Jav. **1**: [54]. 1838. (Type from Java.)

Luzon: Mt. Mariveles, *Elmer 6909.*

Coriolopsis badia (Berk.) Murrill. *Trametes badia* Berk. Lond. Jour. Bot. **1**: 151. 1842. (Type from the Philippines.) *Polystictus badius* Cooke, Grevillea **14**: 86. 1886.

Luzon: Lamao, 70 m., 115 m., 130 m., *Williams.* Culion: *Merrill 3526.* Mindanao: Santa Cruz, Gulf of Davao, *Williams.*

Coriolopsis dermatodes (Lév) Murrill. *Trametes dermatodes* Lév. Ann. Sci. Nat. Bot. III. **2**: 196. 1844. *? Polyporus cervino-gilvus* Jungh. Fl. Crypt. Jav. **1**: [45]. *pl. 9.* 1838. (Type from Java.) *Polyporus dermatodes* Lév.; Gaud. Voy. Bonite **1**: 180. *pl. 138. f. 2.* 1846. *Polyporus Peradeniae* Berk. & Br. Jour. Linn. Soc. Bot. **14**: 51. 1885. (Type from Ceylon.)

Luzon: Lamao, 70 m., 80 m., 115 m., 130 m., *Williams;* Mt. Mariveles, *Elmer 6936, 6957.*

CORIOLOPSIS OCCIDENTALIS (Kl.) Murrill, Bull. Torrey Club **32**: 358. 1905. *Polyporus lanatus* Fr. Epicr. 490. 1838. (Type from the East Indies.) *Polyporus scorteus* Fr. Nov. Symb. 89. 1851. (Type from Pulo-Milu.)

Luzon: Lamao, 15 m., *Williams.* Culion: *Merrill 3571.* Mindanao: Santa Cruz, Gulf of Davao, *Williams.*

Coriolopsis phocinus (Berk. & Br.) Murrill. *Polyporus phocinus* Berk. & Br. Jour. Linn. Soc. Bot. **14**: 52. 1885. (Type from Ceylon.)

Luzon: Lamao, 80 m., *Williams.*

Coriolopsis semilaccata (Berk.) Murrill. *Polyporus zonalis semilaccatus* Berk. Jour. Linn. Soc. Bot. **16**: 46. 1878. (Type from Malamon.) *Fomes semilaccatus* (Berk.) Cooke, Grevillea **15**: 22. 1886.

Luzon: Bataan, *Merrill 3503;* Mt. Mariveles, *Elmer 6929, 6946;* Mt. Banahao, *Elmer 7557.*

CORIOLUS ABIETINUS (Dicks.) Quél. Ench. Fung. 175. 1886.

Luzon: Baguio, *Williams.*

CORIOLUS ATYPUS (Lév.) Pat. Tax. Hymén. 94. 1900. *Polyporus atypus* Lév. Ann. Sci. Nat. Bot. III. **2**: 184. 1844. (Type from Java.) *? Polyporus brunneolus* Berk. Lond. Jour. Bot. **3**: 187. 1844. (Type from the Philippines.) *? Polystictus Didrichsenii* Fr. Nov. Symb. 76. 1851. (Type from the island of Bora-bora.) *Trametes Aurora* Ces. Myc. Borneo 5. 1897. (Type from Borneo.)

Luzon: Lamao, 75 m., 80 m., 115 m., 500 m., *Williams;* Mt. Mariveles, *Merrill 3506, Elmer 6938, 6940, 6947, 6955, 6958;* Bataan, *Merrill 3505.* Mindoro: Baco River, *Merrill 3578.*

Coriolus cuneatiformis Murrill, sp. nov.

Pileus flabelliform, with a cuneate base, thin, dry, flexible, conchate, depressed behind, 2–3 × 3–4 × 0.1 cm.; surface subglabrous, zonate, smooth, white, with pale-avellaneous zones, sometimes avellaneous behind; margin very thin, entire, slightly deflexed when dry: context thin, white, fibrous, less than 1 mm. thick; tubes short, yellowish-white, 1 mm. long, mouths minute, circular to angular, regular, 6 to a mm., edges thin, entire, white to pale-yellowish: spores ellipsoidal, smooth, hyaline, 2.5–3 × 5–6 μ; hyphae hyaline, 3.5–5 μ; cystidia none.

Type collected on the Lamao River, Luzon, 80 m., on dead wood, December 1903, by R. S. Williams.

CORIOLUS ELONGATUS (Berk.) Pat. Tax. Hymén. 94. 1900. *Polyporus elongatus* Berk. Lond. Jour. Bot. **1**: 149. 1842. (Type from the Philippines.)

Luzon: Lamao, 500 m., 700 m., *Williams.*

Coriolus maximus (Mont.) Murrill. *Irpex maximus* Mont. Ann. Sci. Nat. II. **8**: 364. 1837. (Type from Cuba.) *Polyporus Meyenii* Kl. Nov. Act. Acad. Nat. Cur. **19**: Suppl. 236. 1843. (Type from Manila.)

Luzon: Lamao, 80 m., 115 m., *Williams;* Mt. Mariveles, *Elmer 6931;* Bataan, *Merrill 3499.*

Coriolus murinus (Lév.) Pat. Tax. Hymén. 94. 1900. *Polyporus murinus* Lév. Ann. Sci. Nat. Bot. III. **2**: 185. 1844. (Type from Java.)

Luzon: Lamao, 115 m., 130 m., *Williams.* Leyte: Palo, *Elmer 7237.*

Coriolus vernicipes (Berk.) Murrill. *Polyporus vernicipes* Berk. Jour. Linn. Soc. Bot. **16**: 50. 1878. (Type from Japan.)
Luzon: Mt. Banahao, 650 m., *Elmer 7550*.

Cycloporellus* cichoriaceus (Fr.) Murrill. *Polyporus intybaceus* Berk. Lond. Jour. Bot. **1**: 149. 1842. (Type from the Philippines.) Not *P. intybaceus* Fr. *Polystictus cichoriaceus* Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1**: 92. 1855. *Polyporus setiporus* Berk. Hook. Lond. Jour. Bot. **6**: 505. *pl. 20. f. 2.* 1847. (Type from Ceylon.)
Luzon: Upper Lamao, 700 m., *Williams;* Lamao, *Merrill 3528*.

Cycloporellus microcyclus (Lév.) Murrill. *Polyporus microcyclus* Lév. Ann. Sci. Nat. Bot. III. **2**: 188. 1844. (Type from Java.)
Luzon: Lamao, 115 m., *Williams;* Upper Lamao, 700 m., *Williams;* Mt. Mariveles, *Elmer 6937*. Leyte: Palo, *Elmer 7228*.

Earliella corrugata (Pers.) Murrill. *Polyporus corrugatus* Pers.; Gaud. Voy. Freyc. Bot. 172. 1826. *Polyporus fusco-badius* Pers.; Gaud. Voy. Freyc. Bot. 172. 1826. (Type from the Marianne Islands.) *Polyporus scabrosus* Pers.; Gaud. Voy. Freyc. Bot. 172. 1826. (Type from the Marianne Islands.) *? Polyporus mariannus* Pers.; Gaud. Voy. Freyc. Bot. 173. 1826. (Type from the Marianne Islands.) *Daedalea sanguinea* Kl. Linnaea **8**: 481. 1833. (Type from the East Indies.) *? Trametes bicolor* Berk. Trans. Linn. Soc. Bot. **16**: 43. 1878. (Type from the island of Aru.) *Polystictus Persoonii* Cooke, Grevillea **14**: 85. 1886. *Trametes nitida* Pat. Jour. de Bot. **4**: 17. 1890. (Type from Tonkin.)
Luzon: Mt. Mariveles, *Elmer 6921, 6935*. Leyte: Palo, *Elmer 7206, 7208*.

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*The genus *Cyclomycetella* (Bull. Torrey Club **31**: 422. 1904), based on *Boletus pavonius* Hook., becomes a synonym of *Coriolus*, since the real type of this species proves to be a member of the latter genus, rather than synonymous with *Polyporus iodinus* Mont. as generally supposed. I therefore suggest the name **Cycloporellus** for this group of species, with *Polyporus iodinus* Mont. (Ann. Sci. Nat. Bot. II. **16**: 108. 1841) as its type, and with the same diagnosis as that already published for *Cyclomycetella*.

FAVOLUS TENUIS (Hook.) Murrill, Bull. Torrey Club **32**: 100. 1905. *Polyporus bivalvis* Pers.; Gaud. Voy. Freyc. 168. 1826. (Type from Rawak.) *Hexagona orbiculata* Fr. Fung. Guin. *f. 9*. 1837. (Type from Guinea.) *Hexagona cervino-plumbea* Jungh. Crypt. Java 61. *f. 32*. 1838. (Type from Java.) *Hexagona Thwaitesii* B. & C. Proc. Am. Acad. Arts & Sci. **4**: 122. 1860. (Type from Bonin island.)

Luzon: Lamao, 70 m., 130 m., *Williams;* Mt. Mariveles, *Elmer 6927, 6934*. Leyte: Palo, *Elmer 7226*.

FAVOLUS WIGHTII (Kl.) Ricker, Philipp. Jour. Sci. **1**: Suppl. 286. 1906. *Polyporus Wightii* Kl. Linnaea **7**: 200. *pl. 10*. 1832. *Hexagona Wightii* Fr. Epicr. 496. 1838.

Pileus thin, coriaceous, flexible, umbonate-affixed, dimidiate to reniform, applanate when young, becoming deeply depressed with age, 5–10 × 7–16 × 0.2 cm., surface multizonate, marked with a few concentric ridges, pale-umbrinous and nearly glabrous when young, then chestnut-colored, with a few appressed aculeae, and finally opaque-black and clothed with conspicuous, erect or ascending, rigid, flattened, somewhat branched, black aculeae; margin very thin, isabelline, undulate or slightly lobed: context scarcely 1 mm. thick, tough, punky, fibrous; tubes 1.5 mm. long, cinereous or fulvous and glabrous within, mouths large, shallow, equally hexagonal, 1–3 mm. in diameter, cinereous or fulvous, edges thin, rarely obtuse, firm, entire.

Luzon: Mt. Mariveles, *Elmer 6913, 6919;* Lamao, 130 m., *Williams*.

Funalia philippinensis Murrill, sp. nov.

Pileus sessile, dimidiate, subimbricate, applanate above, slightly convex below, 5–10 × 10–15 × 1–2 cm.; surface slightly zonate near the margin, dark-fulvous throughout, very conspicuously clothed with rigid, branched, flattened or terete, concolorous, pointed aculeae, which partially disappear in extreme age; margin ochraceous, sterile, acute, undulate: context ferruginous, thin, punky-corky, 2–3 mm. thick; tubes 5–10 mm. long, ferruginous-fulvous within, mouths circular to hexagonal, very regular, averaging 1 mm. in diameter, edges thin, firm, entire, white when young, becoming dark-umbrinous: spores ovoid, smooth, hyaline, 3.5–4.5 μ; hyphae pale-ferruginous, 2–4 μ; cystidia none.

Type collected on the Lamao River, Luzon, 115 m., on dead wood, February, 1904, by R. S. Williams.

Funalia versatilis (Berk.) Murrill. *Trametes versatilis* Berk.

Lond. Jour. Bot. **1**: 150. 1842. (Type from the Philippines.) *Hexagonia ciliata* Kl. Nov. Act. Acad. Nat. Cur. **19**: Suppl. 235. *pl. 5. f. 1.* 1843. *Polystictus cilicioides* Fr. Nov. Symb. 87. 1851.

Luzon: Lamao, 80 m., 115 m., *Williams.* Mindanao: Santa Cruz, Gulf of Davao, *Williams.*

HAPALOPILUS GILVUS (Schw.) Murrill, Bull. Torrey Club **31**: 418. 1904. *Polyporus discipes* Berk. Hook., Lond. Jour. Bot. **6**: 499. 1847. (Type from Ceylon.) *Polyporus holosclerus* Berk. Lond. Jour. Bot. **6**: 501. 1847. (Type from Ceylon.) *Polyporus spadiceus* Berk. Ann. Mag. Nat. Hist. **3**: 388. 1839. (Type from the East Indies.) *Polyporus breviporus* Cooke, Grevillea **12**: 17. 1883. (Type from Australia.) *Polyporus aureomarginatus* P. Henn. Bot. Jahrb. **22**: 72. 1895. (Type from Kamerun.)

Luzon: Lamao, 70 m., 130 m., *Williams;* Lamao, *Merrill 3525;* Mt. Mariveles, *Elmer 6925.*

HAPALOPILUS LICNOIDES (Mont.) Murrill, Bull. Torrey Club **31**: 417. 1904.

Culion: *Merrill 3607.*

Hapalopilus subrubidus Murrill, sp. nov.

Pileus imbricate, umbonate-sessile or attached by a narrow base, dimidiate or flabelliform, conchate, thin, slightly flexible, 3–4 × 4–6 × 0.1–0.3 cm.; surface glabrous, slightly zonate, fulvous; margin thin, straight, entire or slightly undulate, reddish-brown when bruised: context ferruginous, punky-fibrous, tough, 1–2 mm. thick; tubes short, dark-lilac within, 1 mm. in length, mouths minute, slightly angular, regular, 7–8 to a mm., edges thin, entire, dark flesh-colored to fulvous: spores globose, smooth, hyaline, 3–4 μ; hyphae 2–3 μ, pale-ferruginous; cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by A. D. E. Elmer, *no. 6912.*

HEXAGONA CUCULLATA (Mont.) Murrill, Bull. Torrey Club **31**: 332. 1904.

Mindanao: Santa Cruz, Gulf of Davao, *Williams.*

Hexagona vibecinoides (P. Henn.) Murrill. *Polyporus vibecinoides* P. Henn. Bot. Jahrb. **23**: 546. 1896. (Type from Kamerun, Africa.)

Luzon: Lamao, 70 m., *Williams.*

Inonotus Elmerianus Murrill, sp. nov.

Pileus subimbricate, sessile, dimidiate, conchate, thin, slightly flexible, 3×4–5×0.1–0.3 cm.; surface finely tomentose to nearly glabrous, spongy-tomentose behind or in certain parts, very uneven, slightly zonate, ferruginous to fulvous, fuliginous at times behind; margin thin, undulate, ferruginous: context ferruginous, punky above, fibrous below, 1 mm. or less thick; tubes short, fulvous within, 0.5–1.5 mm. long, mouths very minute, regular, circular to angular, 9–11 to a mm., fulvous to umbrinous, bay when bruised, stuffed with flavous to luteous mycelium when very young, edges thin, entire: spores subglobose, smooth, pale-ferruginous, copious, 2 μ; hyphae pale-ferruginous, 3–4 μ; cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by A. D. E. Elmer, *no. 6942*.

Microporellus subdealbatus Murrill, sp. nov.

Pileus very thin, tough, flexible, flabelliform, tapering to a short flattened stipe, which appears to be merely a continuation of the pileus, 4×3×0.1 cm.; surface zonate, fibrillose to glabrous, resinous in appearance, pale-yellowish or light reddish-brown; margin very thin, sterile, lacerate, uneven: context very thin, white, fibrous, flexible; tubes short, decurrent, white within, mouths small, glistening, irregular, angular, white to slightly yellowish, 5 to a mm., edges acute, uneven, lacerate-dentate, soon becoming irpiciform: spores ovoid, smooth, hyaline, 3–4 μ; hyphae hyaline, 3–4 μ; cystidia none.

Type collected in the Province of Bataan, Luzon, on prostrate logs, October, 1903, by E. D. Merrill, *no. 3511*.

Nigroporus durus (Jungh.) Murrill. *Polyporus durus* Jungh. Fl. Crypt. Jav. **1**: [62]. 1838. (Type from Java.)

Luzon: Bataan, *Merrill 3500*.

NIGROPORUS VINOSUS Murrill, Bull. Torrey Club **32**: 361. 1905. (Type from San Domingo.)

Luzon: Lamao, 70 m., *Williams*. Leyte: Palo, *Elmer 7212*.

POLYPORUS CELEBICUS P. Henn. Monsunia **1**: 12. *pl. 1. f. 5*. 1899. (Type from Celebes.)

Luzon: Lamao, 75 m., 80 m., 130 m., *Williams*.

Polyporus coracinus Murrill, sp. nov.

Pileus suborbicular to reniform, attached by a short lateral tubercle, thin, fleshy-tough, conchate, 3–4×4–5×0.2 cm., surface yellowish-white, finely tomentose, becoming glabrous and black;

margin thin, entire, concolorous: context less than 1 mm. thick, homogeneous and white to pallid, except the very thin black cuticle; tubes 1.5 mm. long, white to avellaneous within, mouths circular, regular, 4 to a mm., pallid to black, edges very obtuse, entire: spores subglobose, smooth, hyaline, 2.5–3.5 μ; hyphae 3 μ; cystidia dark-fulvous, short, ventricose, sharp-pointed, 10–25 μ, often branched or cespitose.

Type collected at Palo, Leyte, on dead sticks, January, 1906, by A. D. E. Elmer, *no. 7232*.

POLYPORUS GRAMMOCEPHALUS Berk. Lond. Jour. Bot. **1**: 148. 1842. (Type from the Philippines.)

Mindanao: Santa Cruz, Gulf of Davao, *Williams*.

Polyporus palensis Murrill, sp. nov.

Pileus flabelliform, tapering behind, shallowly depressed to infundibuliform, 2–3 × 2–3 × 0.1 cm.; surface white to fulvous, finely radiate-striate, glabrous; margin very thin, entire to undulate or lacerate, inflexed on drying: context very thin, fleshy, white, fragile when dry; tubes decurrent, less than 1 mm. long, white or slightly flesh-colored within, mouths minute, white to dull-fulvous, fragile when dry, somewhat radially elongated, 0.5 × 0.25 mm., edges lacerate-dentate, becoming almost irpiciform in appearance: spores oblong-ellipsoid, smooth, hyaline, 3–4 × 5–6 μ; hyphae smooth, hyaline, 3–4 μ; cystidia none: stipe lateral, rarely eccentric, short, tapering below, white, terete, striate above, covered with tubes below at the base, 3 mm. long, 2 mm. thick.

Type collected at Palo, Leyte, on dead sticks, January, 1906, by A. D. E. Elmer, *no. 7236*.

POLYPORUS PERULA (Beauv.) Fr. Epicr. 437. 1838. *Microporus Perula* Beauv. Fl. Owar. **1**: 12. *pl. 43*. 1805. (Type from Wari.). *Polyporus xanthopus* Fr. Obs. Myc. **2**: 255. 1818. (Type locality unknown.) *Polyporus affinis* Nees, Nov. Act. Acad. Nat. Cur. **13**[1]: *pl. 4. f. 1*. 1826. *Polyporus incomptus* Fr. Epicr. 437. 1838. (Type from Guinea.) *Polyporus polychrous* Ces. Myc. Borneo 4. 1879. (Type from Borneo.) *Polyporus carneo-niger* Berk.; Cooke, Grevillea **12**: 15. 1883. (Type from Australia.)

Luzon: Baguio, *Williams*; Bataan, *Merrill 3498, 3502, 3535*; Mt. Banahao, *Elmer, 7546, 7552, 7555*; Lamao, 70 m., 80 m., 100 m., 115 m., 700 m., *Williams*; Mt. Mariveles, *Elmer 6908, 6920, 6923, 6926, Merrill 3495*. Mindanao:

Santa Cruz, Gulf of Davao, *Williams*. Mindoro: Baco River, *Merrill 3582*. Palawan: Ewiig River, *Merrill 3585, 3588*. Culion: *Merrill 3605*.

POLYPORUS VIBECINUS Fr. Kongl. Vet.-Akad. Handl. Stockh. 126. 1849. (Type from Natal.)

Luzon: Lamao, 80 m., *Williams*.

PYCNOPORUS SANGUINEUS (L.) Murrill, Bull. Torrey Club **31**: 421. 1904.

Luzon: Lamao, 75 m. and 130 m., *Williams;* Province of Tarlac, *Merrill 3601*. Leyte: Palo, *Elmer 7239*. Mindanao: Santa Cruz, Gulf of Davao, *Williams*.

Rigidoporus surinamensis (Miq.) Murrill. *Polyporus surinamensis* Miq. Bull. Sci. Phys. Nat. Néerl. **1839**: 454. 1839. *Polyporus zonalis* Berk. Ann. Mag. Nat. Hist. **10**: Suppl. 375. *pl. 10. f. 5*. 1843. (Type from Ceylon.)

Luzon: Mt. Banahao, 900 m., *Elmer 7549*.

Spongipellis luzonensis Murrill, sp. nov.

Pileus thin, tough, rigid, imbricate, laterally connate, sessile, dimidiate, somewhat decurrent, conchate, 1–1.5 × 1.5–2.5 × 0.2–0.5 cm.; surface azonate, anoderm, fibrillose-tomentose, white to discolored, absorbing water; margin thin, undulate, concolorous, easily bruised, fertile, decurved when dry: context spongy-fibrous, white to pale-isabelline, about 2 mm. thick, tubes white to discolored, tough, elastic, 2–3 mm. long, mouths white to discolored, irregular, 4–6 to a mm., subglistening, edges very thin, fimbriate-dentate: spores globose, smooth, hyaline, 3–4 μ; hyphae hyaline, 5–6 μ; cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by A. D. E. Elmer, *no. 6944*.

Trametes caespitosa Murrill, sp. nov.

Hymenophore densely imbricate, dimidiate, conchate, laterally connate, 1–2 × 2–3.5 × 0.2–0.3 cm.; surface puberulent to subglabrous, smooth, very slightly subzonate, pale-avellaneous, with a tinge of pale-purple; margin rather thick, concolorous, undulate, sharply deflexed: context white, fibrous, rigid, tough, 1–2 mm. thick; tubes white to pallid, 1–1.5 mm. long, mouths very regular, minute, circular, white to pallid, with a tinge of flesh color, 7–8 to a mm., edges rather thick, firm, tough, entire: spores smooth, hyaline, ovoid, copious, 5–6 × 7–7.5 μ; hyphae hyaline, 5–6 μ; cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by A. D. E. Elmer, *no. 6951*.

Trametes lamaensis Murrill, sp. nov.

Pileus subcircular, narrowly attached, convex above and below, 3–4 × 3–4 × 1 cm.; surface finely puberulent, anoderm, slightly zonate or sulcate at times, white or pale-isabelline; margin rather thick, sterile, concolorous, entire: context white, subzonate, punky-corky, 7 mm. thick; tubes firm, tough, pallid, 2–3 mm. long, mouths somewhat irregular, circular to angular, 2–3 to a mm., subglistening, white to isabelline, edges rather thick, entire: spores globose, smooth, hyaline, 5–6 μ; hyphae hyaline, 4–5 μ; cystidia none.

Type collected on the Lamao River, Luzon, 130 m., on dead deciduous wood, February, 1904, by R. S. Williams.

Trametes luzonensis Murrill, sp. nov.

Pileus small, laterally connate, dimidiate, sessile, rarely encircling the twig, conchate, 1–2 × 1.5–3 × 0.2–0.4 cm.; surface smooth, anoderm, finely tomentose to subglabrous, white to very pale avellaneous, entirely without marks; margin acute, entire, deflexed when dry: context punky, white, 1–2 mm. thick; tubes white within, 1–2 mm. long, tough, mouths regular, minute, circular, 6 to a mm., edges white to slightly discolored, rather thick, entire: spores smooth, hyaline.

Type collected on Mt. Mariveles, Luzon, on dead sticks, November, 1904, by A. D. E. Elmer, *no. 6932*.

TRAMETES MÜLLERI Berk. Jour. Linn. Soc. Bot. **10**: 320. 1868. (Type from Victoria River, Australia.)

Luzon: Province of Tarlac, *Merrill 3602*.

Trametes ostreaeformis (Berk.) Murrill. *Polyporus ostreaeformis* Berk. Jour. Linn. Soc. Bot. **16**: 46. 1878. (Type from the Philippines.)

Luzon: Lamao, 600 m., *Williams*.

Trametes subacuta Murrill, sp. nov.

Pileus very large, dry, firm, slightly flexible, reniform, sessile, applanate, 10–12 × 20 × 1–2 cm.; surface narrowly zonate, finely puberulent, becoming glabrous and tuberculose behind, avellaneous or umbrinous in front, murinous behind; margin ochraceous, thin, entire, fertile: context punky-corky, rather soft, white, 5–7 mm. thick; tubes 5 mm. long, white to pallid within, firm, tough, mouths glistening, very regular, circular, 2–3 to a mm., white to pale-isabelline, edges rather thin, entire: spores subglobose to

ovoid, smooth, hyaline, 4–5 μ long, hyphae hyaline, 3–5 μ; cystidia none.

Type collected on the Lamao River, Luzon, 115 m., on dead deciduous wood, December, 1903, by R. S. Williams.

Trametes Williamsii Murrill, sp. nov.

Pileus sessile, dimidiate, subimbricate, at times laterally connate, applanate, thicker behind, 4–5 × 4–7 × 1 cm.; surface finely tomentose to nearly glabrous, slightly zonate, isabelline or avellaneous, sometimes partly murinous, anoderm, slightly tuberculose; margin thick, sterile, entire, easily bruised: context corky, tough, somewhat zonate, white, 5–7 mm. thick, eagerly devoured by insects; tubes pallid, 5 mm. long, tough, firm, mouths circular, regular, pallid, 2–3 to a mm., edges thick, obtuse, entire: spores globose, smooth, hyaline, 4–5 μ; hyphae hyaline, 3–4 μ; cystidia none.

Type collected at Santa Cruz, Gulf of Davao, Mindanao, on dead pine logs, June, 1905, by R. S. Williams.

Tyromyces Elmeri Murrill, sp. nov.

Pileus fleshy, rigid and fragile when dry, dimidiate, sessile, subimbricate, 2–3 × 3–4 × 0.2–0.3 cm.; surface rough, with minute tubercles and pits, glabrous, white to isabelline; margin rather thick, entire, concolorous: context white, fleshy-tough, 1 mm. thick; tubes white to isabelline within, 2 mm. long, mouths slightly angular, minute, regular, 6–7 to a mm., pruinose, glistening, at length avellaneous, edges thin, entire: spores globose, smooth, hyaline, 3–4 μ; hyphae hyaline, 4–5 μ; cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by A. D. E. Elmer, *no. 6954*.

Subfamily FOMITEAE

Amauroderma Elmerianum Murrill, sp. nov.

Pileus stipitate, umbonate-affixed, subcircular to reniform, usually convex above, plane or slightly concave below, hard and rigid, 3 × 4–7 × 0.5–1 cm.; surface thinly encrusted, finely puberulent, conspicuously radiate-rugose, many times sulcate, marked with narrow, avellaneous lines and broad, fuliginous or black zones; margin thick, truncate, zonate, crumpled or rugose, concolorous: context avellaneous, punky-corky, homogeneous, 2–4 mm. thick; tubes 3–7 mm. long, slender, avellaneous within, mouths regular, circular, constricted, 5–6 to a mm., nearly white to smoky-black, reddish-brown when bruised, edges thick, obtuse, entire: spores subglobose, very pale brown, finely echinulate,

thick-walled, 5–6 μ; hyphae subhyaline, 3–5 μ; cystidia none: stipe laterally-attached, ascending, cylindrical, subequal, 3–12 cm. long, 0.7–1.3 cm. thick, resembling the pileus in surface and substance.

Type collected at Palo, Leyte, on dead stumps, January, 1906, by A. D. E. Elmer, *no. 7210*. Also collected on Mt. Mariveles, Luzon, November, 1904, by Elmer, *no. 6960*.

Elfvingia Elmeri Murrill, sp. nov.

Pileus very large,compressed-ungulate, convex above, slightly concave below, sessile, dimidiate, very hard, 20 × 25–35 × 4–7 cm.; surface glabrous, deeply sulcate, tuberculose, horny-encrusted, becoming slightly rimose when old and dry, but never weathering, brown with a grayish tinge; margin thick, rounded, ferruginous, entire: context ferruginous to fulvous, punky-corky, rather firm, 1–2 cm. thick; tubes distinctly stratified, 1–2 mm. long each season, fulvous within, mouths circular, regular, 5 to a mm., edges rather thin, entire: spores ferruginous, globose, smooth, 5–6 μ; hyphae ferruginous, 3–4 μ; cystidia ventricose, fulvous, sharp-pointed, copious, 15–40 μ long.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by A. D. E. Elmer, *no. 6961*.

ELFVINGIA TORNATA (Pers.) Murrill, Bull. Torrey Club **30**: 301. 1903. *Polyporus tornatus* Pers.; Gaud. Voy. Freyc. Bot. 173. 1826. (Type from islands in the Pacific ocean.) *Polyporus australis* Fr. Elench. 108. 1828. (Type from islands in the Pacific ocean.)

Luzon: Mt. Mariveles, *Elmer 6916*. Culion: *Merrill 3572*. Leyte: Palo, *Elmer 7209*.

Fomes luzonensis Murrill, sp. nov.

Pileus dimidiate, umbonate-affixed, compressed-ungulate, very convex above, plane or slightly concave below, 4 × 6–8 × 1–2 cm.; surface zonate, sulcate, glabrous, horny-encrusted, dull-brown in the older portions, pale-isabelline on the thin, expanded, recent growth; margin acute, narrowly sterile, pallid, undulate, straight: context thin, 1–2 mm., pale-isabelline, punky-corky; tubes distinctly stratose, isabelline within, 2–3 mm. long each season, mouths regular, circular, 5 to a mm., white to isabelline, opaque, edges thick, firm, tough, obtuse, entire: spores globose, smooth, hyaline, 5 μ; hyphae hyaline, 4 μ; cystidia none.

Type collected on the Lamao River, Luzon, 500 m., on a decaying trunk, January, 1904, by R. S. Williams.

Fomes philippinensis Murrill, sp. nov.

Pileus dimidiate, sessile, bracket-shaped, applanate above, plane or convex below, 5–10 × 10–15 × 1–2.5 cm.; surface horny, thinly encrusted, radiate-rugose, glabrous, somewhat zonate, shallowly sulcate, becoming slightly rimose with age, pale-isabelline to dull-umbrinous; margin sterile, pallid, glabrous, zonate, rather thick, entire, at length somewhat truncate and furrowed: context punky, tough, isabelline, zonate, 5–10 mm. thick; tubes more or less distinctly stratified, 2–3 mm. long each season, isabelline within, mouths pallid, regular, circular, 5 to a mm., edges thick, obtuse, entire: spores ovoid, smooth, hyaline, 5 × 4 μ; hyphae hyaline, 3–4 μ; cystidia none.

Type collected on the Lamao River, Luzon, 700 m., on a dead trunk, March 23, 1904, by R. S. Williams.

FOMES SEMITOSTUS Berk. Jour. Bot. & Kew Misc. **6**: 143. 1854. (Type from the Khasia Mountains, India.)

Luzon: Lamao, 80 m., *Williams;* Mt. Mariveles, *Elmer 6050.* Leyte: Palo, *Elmer 7222.*

GANODERMA AMBOINENSE (Lam.) Pat. Bull. Soc. Myc. Fr. **5**: 70. 1889. *Agaricus amboinensis* Lam. Enc. **1**: 49. 1783. (Type from Amboina.)

Luzon: Lamao, 80 m., *Williams.*

Ganoderma subtornatum Murrill, sp. nov.

Pileus sessile, short-stipitate, flabelliform, with a narrow base, applanate, slightly concave below, hard and rigid, 6–11 × 6–12 × 1 cm.; surface thinly encrusted, shining-black, except where covered with the brown conidia, glabrous, sulcate, radiate-rugose; margin truncate, slightly furrowed, sterile, entire: context 2–4 mm. thick, punky, white above, chestnut-colored below; tubes unstratified, slender, 5–8 mm. long, avellaneous-umbrinous within, mouths regular, circular, 5 to a mm., smoky-fuliginous, edges obtuse, entire: spores ovoid, pale-brown, finely asperulate, 9 × 6–7 μ; hyphae dark-brown, 5–6 μ; cystidia none: stipe lateral, compressed, 0–2 cm. long, 1.5–2 cm. thick, resembling the pileus in surface and substance.

Type collected on the Lamao River, Luzon, 100 m., on a decayed trunk, November, 1903, by R. S. Williams. Collected also on Mt. Mariveles, Luzon, November, 1904, by A. D. E. Elmer, *no. 6943*, and at Palo, Leyte, January, 1906, by Elmer, *no. 7213.*

Ganoderma Williamsianum Murrill, sp. nov.

Pileus sessile, dimidiate, compressed-ungulate or applanate, usually convex above, plane or concave below, subimbricate, rigid, 3–4 × 5–6 × 1–2 cm.; surface shallowly sulcate, slightly zonate, radiate-rugose, avellaneous, with narrow, dark zones when young, at length ochraceous-pulverulent from the secreted varnish, and finally glabrous, laccate, and bay or black; margin conchate at maturity, yellowish-brown, laccate, entire, sterile: context chestnut-colored, punky, soft, 3–6 mm. thick; tubes not stratified, slender, murinous-umbrinous within, hymenium white to ochraceous or melleous, mouths circular to slightly angular, regular, 5 to a mm., edges obtuse and entire when young, soon becoming thin: spores broadly ovoid, truncate, dark-brown, roughly echinulate, thick-walled, 8–9 × 12–14 μ; hyphae concolorous, 5–6 μ; cystidia none.

Type collected on the Lamao River, Luzon, 115 m., on a dead trunk, January, 1904, by R. S. Williams.

NIGROFOMES MELANOPORUS (Mont.) Murrill, Bull. Torrey Club **31**: 425. 1904. *Fomes melanoporoides* Ces. Myc. Borneo 6. 1879. (Type from Borneo.) *Fomes Cornu-bovis* Cooke, Grevillea **13**: 2. 1884. (Type from Malacca.) *? Polyporus cinereo-fuscus* Currey, Trans. Linn. Soc. II. **1**: 124. *pl. 19. f. 1.* 1876. (Type from India.)

Luzon: Lamao, *Williams;* Mt. Mariveles, *Elmer 6959.*

Pyropolyporus albomarginatus (Lév.) Murrill. *Polyporus albomarginatus* Lév. Ann. Sci. Nat. Bot. III. **2**: 191. 1844. (Type from Java.) *Polyporus Kermes* Berk. & Br. Jour. Linn. Soc. Bot. **14**: 49. 1875. (Type from Ceylon.) *Polyporus laeticolor* Berk. Jour. Linn. Soc. Bot. **16**: 46. 1878. (Type from the Philippines.) *Fomes pyrrhocreas* Cooke, Grevillea **14**: 11. 1885. (Type from New Guinea.)

Luzon: Lamao, 115 m., *Williams.*

Pyropolyporus caliginosus (Berk.) Murrill. *Polyporus caliginosus* Berk. Jour. Linn. Soc. Bot. **16**: 46. 1878. (Type from Philippines.) Not *Polyporus caliginosus* Ces. Myc. Borneo 5. 1879. (Type from Borneo.)

Leyte: Palo, *Elmer 7221.*

Pyropolyporus endotheius (Berk.) Murrill. *Polyporus endotheius* Berk. Jour. Linn. Soc. Bot. **16**: 47. 1878. (Type from the Philippines.)

Culion: *Merrill 3575.*

Pyropolyporus fastuosus (Lév.) Murrill. *Polyporus fastuosus* Lév. Ann. Sci. Nat. Bot. III. **2**: 190. 1844. (Type from Singapore.)

Luzon: Lamao, 80 m., *Williams*.

Pyropolyporus lamaensis Murrill, sp. nov.

Pileus dimidiate, sessile, thin, subimbricate, applanate, 2 × 4 × 0.3–0.7 cm.; surface finely tomentose, zonate, slightly sulcate, horny-encrusted, fulvous-chestnut; margin thick, obtuse, sterile, ferruginous, entire: context luteous to ferruginous, hard, woody, homogeneous, 3–5 mm. thick; tubes 2 mm. long, smoky-avellaneous within, mouths circular, regular, minute, 6 to a mm., opaque, dull smoke-colored, edges thin, entire: spores globose to ovoid, smooth, hyaline, 3.5–5 μ long; hyphae ferruginous, 4 μ; cystidia slender, pointed, 15–40 μ, dark-fulvous.

Type collected on the Lamao River, Luzon, on decayed wood, November, 1904, by R. S. Williams.

Pyropolyporus Merrillii Murrill, sp. nov.

Pileus sessile, ungulate, plane below, 4 × 6 × 3–5 cm.; surface finely tomentose, deeply sulcate, anoderm or slightly encrusted, hard, bay, becoming blackish and weathered in the older layers; margin fulvous, sterile, finely tomentose, obtuse, undulate: context dark-fulvous, hard, horny, 3–6 mm. thick; tubes indistinctly stratified, fulvous within, 2–4 mm. long each season, mouths fulvous, subcircular, regular, 4 to a mm., edges rather thick, entire: spores ferruginous-fulvous, copious, subglobose, smooth, 3–4 μ; hyphae concolorous, 4 μ; cystidia none.

Type collected in Culion, on decaying trees near the seashore, December 1902, by E. D. Merrill, *no. 3575*.

Pyropolyporus pectinatus (Kl.) Murrill. *Polyporus pectinatus* Kl. Linnaea **8**: 485. 1833. (Type from the East Indies.) *Fomes pullus* (Berk. & Mont.) Cooke, Grevillea **14**: 19. 1885. (Type from Java.)

Luzon: Lamao, 80 m., *Williams*; Mt. Mariveles, *Elmer 6933*. Palawan: Ewiig River, *Merrill 3586*.

Pyropolyporus Williamsii Murrill, sp. nov.

Pileus bracket-shaped, sessile, dimidiate, plane above, convex below, very hard, horny and brittle, 5–8 × 8–15 × 1–2 cm., surface finely tomentose to glabrous, dark-bay to black, horny-encrusted, deeply and roughly sulcate, somewhat tuberculose, slightly cracking with age; margin isabelline, sterile, rounded, entire or undulate: context 8–10 mm. thick, ferruginous, hard,

radiate-striate, with white dendroid markings; tubes distinctly stratified, 2–3 mm. long each season, umbrinous to avellaneous within, mouths circular, avellaneous, opaque, regular, 5 to a mm., edges thick, obtuse, entire: spores subglobose, smooth, hyaline, 3–5 μ; cystidia dark-fulvous, ventricose, pointed, 15–30 μ long.

Type collected on the Lamao River, Luzon, 80 m., on a dead trunk, December, 1903, by R. S. Williams. What appears to be a young, deformed specimen of this species was collected on Mt. Banahao, Luzon, 500 m., on dead timber, May, 1906, by A. D. E. Elmer, *no. 7556*.

Subfamily DAEDALEAE

DAEDALEA AMANITOIDES Beauv. Fl. Owar. **1**: 44. *pl. 25*. 1804. (Type from Wari.) *Daedalea Palisoti* Fr. Syst. **2**: 335. 1821. *Lenzites Palisoti* Fr. Epicr. 404. 1838. Afzel. Fung. Guin. **1**: *pl. 11, f. 23. a. b.* *Daedalea repanda* Pers.; Gaud. Voy. Freyc. Bot. 168. 1826. (Type from the island of Rawak.) Mont.Cuba 382. *pl. 14. f. 4*. 1842. *Lenzites repanda* Fr. Epicr. 404. 1338. *Daedalea applanata* Kl. Linnaea **8**: 481. 1833. (Type from Mauritius.) *Lenzites applanata* Fr. Epicr. 404. 1838. *Lenzites pallida* Berk. Lond. Jour. Bot. **1**: 146. 1842. (Type from Manila.) *Lenzites platypoda* Lév. Bonite Crypt. **1**: 184. 1844–1846. Ann. Sci. Nat. Bot. III. **2**: 180. 1844. (Type from Manila.)

Luzon: Lamao, 70 m., *Williams;* Mt. Mariveles, *Elmer 6942*. Leyte: Palo, *Elmer 7218*. Culion: *Merrill 3574*.

DAEDALEA HOBSONI Berk. Jour. Linn. Soc. Bot. **13**: 165. 1873. (Type from Australia.) *? Trametes colliculosa* Berk. Lond. Jour. Bot. **6**: 506. 1847. (Type from Ceylon.)

Luzon: Lamao, 115 m., *Williams;* Mt. Mariveles, *Elmer 6914, 6928, 6948; Merrill 3507*. Culion: *Merrill 3608*.

Gloeophyllum edule Murrill, sp. nov.

Pileus imbricate, sessile, dimidiate, conchate or applanate, slightly decurrent at times, 4–7 × 6–10 × 0.3–0.6 cm.; surface short-tomentose to almost glabrous behind, subzonate, ochraceous-isabelline to pale-fulvous, becoming bleached with age, with a few, shallow, concentric furrows; margin acute, entire or undulate, ochraceous, tomentose, brownish when bruised: context ferruginous, punky, 2–4 mm. thick, soft enough when young to be

eaten by the native Igorrotes; hymenium lenzitoid, furrows several times forked, 2–4 mm. deep, about 1 mm. broad, edges pallid to avellaneous-fulvous, entire and rather thick when young, becoming thin and somewhat lacerate-dentate with age: spores elongate-ellipsoid, smooth, hyaline, $7 \times 3\ \mu$; hyphae pale-ferruginous, $3–4\ \mu$; cystidia none.

Type collected at Baguio, Luzon, 1750 m., on fallen dead logs of *Pinus insularis*, September, 1904, by R. S. Williams.

NEW YORK BOTANICAL GARDEN.

INDEX TO AMERICAN BOTANICAL LITERATURE
(1907)

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in its broadest sense.

Reviews, and papers which relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omissions their kindness will be appreciated.

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